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The Occurrence of Blindness in the Black Bullhead, *Ictalurus melas* (Rafinesque), of East Okoboji Lake, Iowa

By James Mayhew

During the summer of 1954 anglers reported numerous blind bullheads at East Okoboji Lake, Dickinson County, Iowa. Eventually one of these specimens was brought to the State Conservation Commission Biology Laboratory for examination. Blindness, of course, is not uncommon in fishes, but this type was apparently due to the complete absence of functional eyes. Gunter (1956) has reported on a red drum, from Abazon Bay, Texas, with a similar sightless condition. With evidence suggesting that blindness was rather common in East Okoboji, special attention was given to the bullheads captured during the annual fisheries survey of the lake.

From the 1954 survey seine hauls, 2,753 bullheads were examined, of which 27 blind individuals were observed. One additional blind specimen was caught in Upper Gar Lake which connects with East Okoboji on the south. In 1955, special attention was again given to the bullheads captured during the survey. In six seine hauls, 3,646 adult bullheads were examined and 31 sightless fish were obtained. Several thousand immature specimens were also examined without finding apparent ophthalmological disturbances. The blind and normal individuals were easily separated since the skin of the sightless fish is very heavily pigmented making them appear much darker than the normal specimens. Creel census clerks reported approximately ten more of these sightless fish in anglers' catches.

Fourteen blind bullheads were preserved or frozen in an effort to determine: (1) the cause of the apparent lack of functional eyes, (2) the age and growth in comparison to normal bullheads, and (3) the physical condition of the blind fish to determine if the blindness had affected feeding habits enough to alter the well-being of the fish.

Examination of the Eye

Several blind fish were examined by dissecting the eye to determine if possible, the cause of blindness. A binocular dissecting microscope was used for the examination of the internal eye. A normal bullhead eye was also dissected to serve as a basis for comparison.

The eyes of the blind bullheads were covered with a thick layer of epidermis similar to that of the body. Apparently this replaced the lens and cornea since neither could be located. The optic nerve was

well contained within the optic stalk and appeared normal. Muscles of the eye were apparently functional. Internally, the eye was heavily pigmented and when dissected the pigment appeared as a dark mass in the center of an abnormal cartilagenous schlera. The vitreous fluid of the eye was much less viscous than in the normal eye.

Age and Growth

The pectoral spine cross section method as described by Sneed (1950) and the vertebral method used by Lewis (1949) were employed in aging the blind bullheads. Only the pectoral spines were used in calculating growth rate. In the assessment of age there was no discrepancy between the two methods.

As in most studies, microprojection was used to enlarge the spine sections image, and the annual growth marks transposed on paper tagboard strips. The standard length at the end of each year of life was then computed by use of a nomograph.

All spines of the blind bullheads exhibited four annual growth rings and indicated that all the blind fish belonged to the 1951 year class. The average calculated standard length from the first to the fourth years was 2.4, 5.3, 6.6, and 7.6 inches. This can be compared with the findings of Lewis (1950) at Red Haw Hill Lake, Iowa, where the average total length was 5.1, 7.1, and 10.2 inches at the second, third, and fourth years of life respectively. Additional comparative growth rates, except for small ponds, could not be located in the literature.

Condition Factors

A condition or "K" factor is normally used to express the plumpness or physical well-being of fish. Although several methods can be used to determine this factor, reciprocals of the standard length were used in this study.

The condition factors of the fourteen blind bullheads ranged from 1.96 to 3.35, and averaged 2.81. This can be compared with a mean "K" of 2.81 and a range of 2.46 to 3.43 for fifteen normal bullheads from the lake. Hence, using this factor as a measure, the physical condition of the fish was apparently not adversely affected by the blindness. Gunter (Op. Cit.) reports this to be true of blind red drum, but stated further that the fish had apparently altered their feeding habits to compensate for the blindness.

Discussion

After the internal examination of the eye there was little doubt the fish were completely without sight. The epidermis covering the

eye is so thick that penetration of any quantity of light for transmission of an image would be negligible. It is believed the bullheads were probably blind from the time of hatching, and possibly came from the same nest. In this case the malfunctions are thought to have occurred during the embryological development of the lens, cornea, and nervous tissue.

Since bullheads are primarily bottom feeders, using taste or odor to locate their food, it is doubtful if the blindness greatly affected feeding habits.

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